

NGI Joint Engineering Team and the 100x internet

**PITAC NGI Program Review
January 14, 2000**



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Joint Engineering Team

- Joint between NGI program, Internet2 project, other federal agencies/networks/projects
- Reports to LSN
- Mainly composed of 100x infrastructure network managers and engineers
- Backbones participating are called “JETnets”
- Recently lost my co-chair to a startup, looking for a new one

The 100x Infrastructure

- A “leading edge but stable” infrastructure for providing end-to-end high performance and advanced services (referred to as NGI/I2 class) for the purpose of R&E applications development
- Wide area backbone networks (referred to as “JETnets”) involved in this infrastructure:



(DREN)



JETnets NGI Funding and Service Types

<i>Network</i>	<i>NGI Program Funding</i>	<i>NGI/I2 Class Service</i>	<i>Commodity Internet Service</i>
Abilene	Yes	Yes	No
DREN	No	Yes	Yes
ESnet	Yes	Yes	Yes
NISN	No	Limited	Yes
NREN	Yes	Yes	No
vBNS	Yes	Yes	No

NSF funds vBNS (directly and indirectly)
and Abilene (indirectly)

JET Completed and On-going Activities

These are coordination activities, the work itself is done by participating entities

- NGIXes establishment and getting JETnets connect to them
-- mixed success
- Alaska and Hawaii connections
-- excellent success
- Federal research sites connectivity to Gigapops
-- mixed success
- Deployment of measurement tools by network operators
-- good success
- Identification of key end-to-end performance problems
-- good success
- Interoperable native multicast between JETnets
-- good success

JET New Activities

- Major efforts toward solving the end-to-end performance problems
- Closer interaction with Gigapops and campus operators
- Puerto Rico connection
- More active in international connections with the new “distributed STARTAP” model
- Re-starting better definition of “NGI/I2 class” networks and services

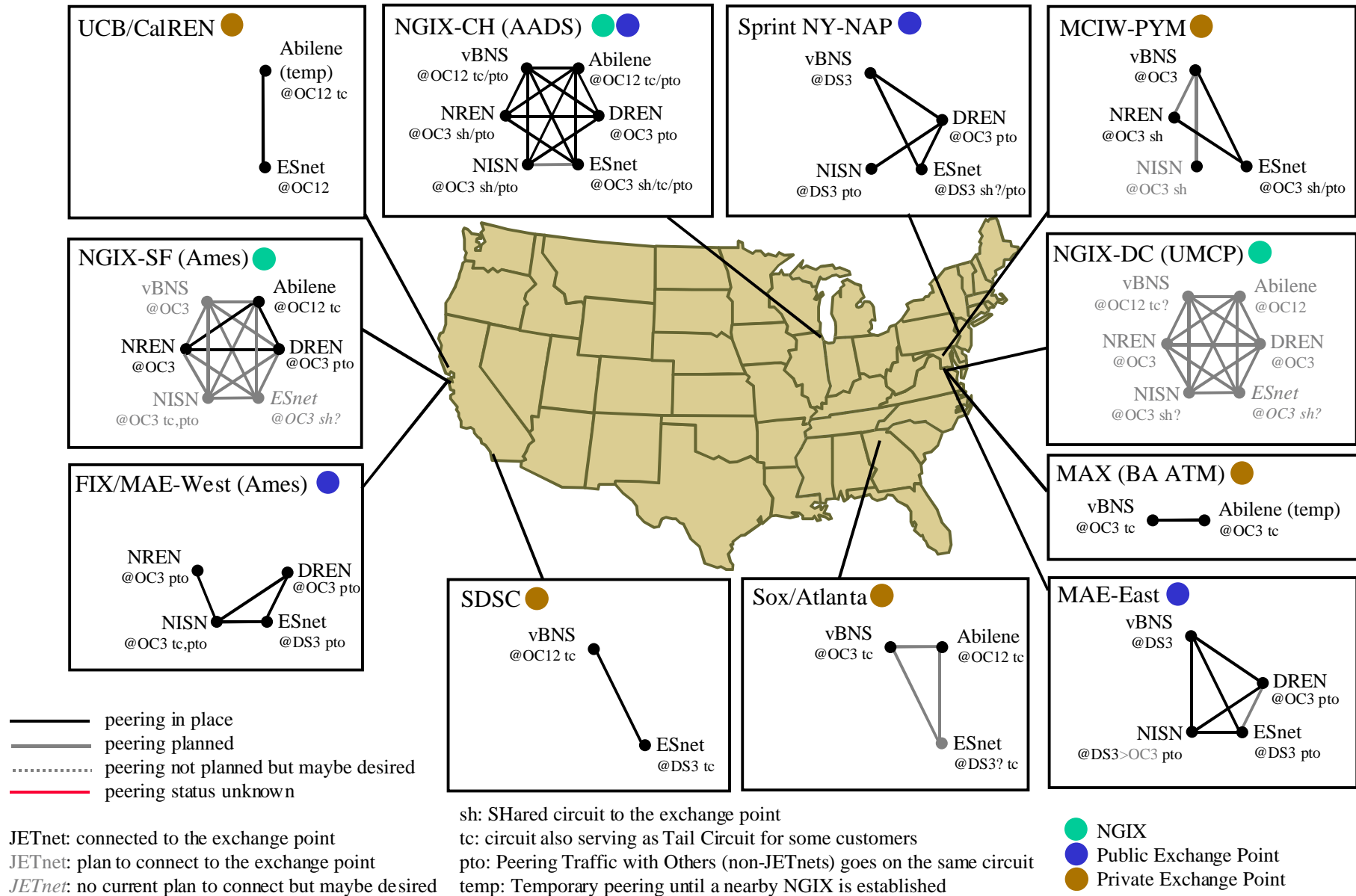
JET Events

- Monthly half day meetings
- Joint meetings with I2 Topology, Routing and Measurements WGs
- Joint meetings with Gigapop operators groups
- Active JET members participation in the NLANR-I2 Techs Workshops

NLANR-Internet2 Techs Workshops

- Main event of the 100x network engineers
- Presentations on 100x infrastructure updates (backbones, Gigapops, campuses), networking technologies and applications
- Popular tutorials and in-depth technical sessions
- Started as “vBNS Techs” meetings in Jan 98
- Attendance rapidly increasing (320 in Dec99 up from 180 in Nov98)
- Increasing international and industrial participants
- Canarie joining NLANR and I2 as main sponsors
- Location rotates between campuses of I2 universities

JETnets Interconnections and Peering



Passive Measurements

- About 25 OC3mon and OC12mon machines deployed to date
- OC48mon under development (key for Abilene)
- Using optical splitters steals 10% of optical energy to copy headers (IP, ATM) from actual user traffic flows
- MCIW collected data is at:
<http://www.vbns.net/stats/flows/data/results/hibw/>
- Collects flows over 10Mbps

Active Measurements

- About 100 AMP machines and about 50 Surveyor machine deployed to date
- Measures round-trip times, one-way delay, packet loss rate and topology
- Still no throughput measurement, that's coming soon once
- As reported in October, the idea is to use a combination of these platforms as well as a possible new laptop platform for active throughput measurements and performance troubleshooting

Plans for Performance Improvement

as reported in October with updates

- “Identifying those end systems/applications that have sink/source of large volume traffic; contacting the owners to understand their application and systems and help them with better tuning”
 - data collection using OCXmons well underway, working with end system owners still has not begun
- “Providing fined tuned laptops for measuring end-to-end performance from particular subnet to help local net operators to find network problems”
 - no major progress here, experts still analyzing various OS options/issues

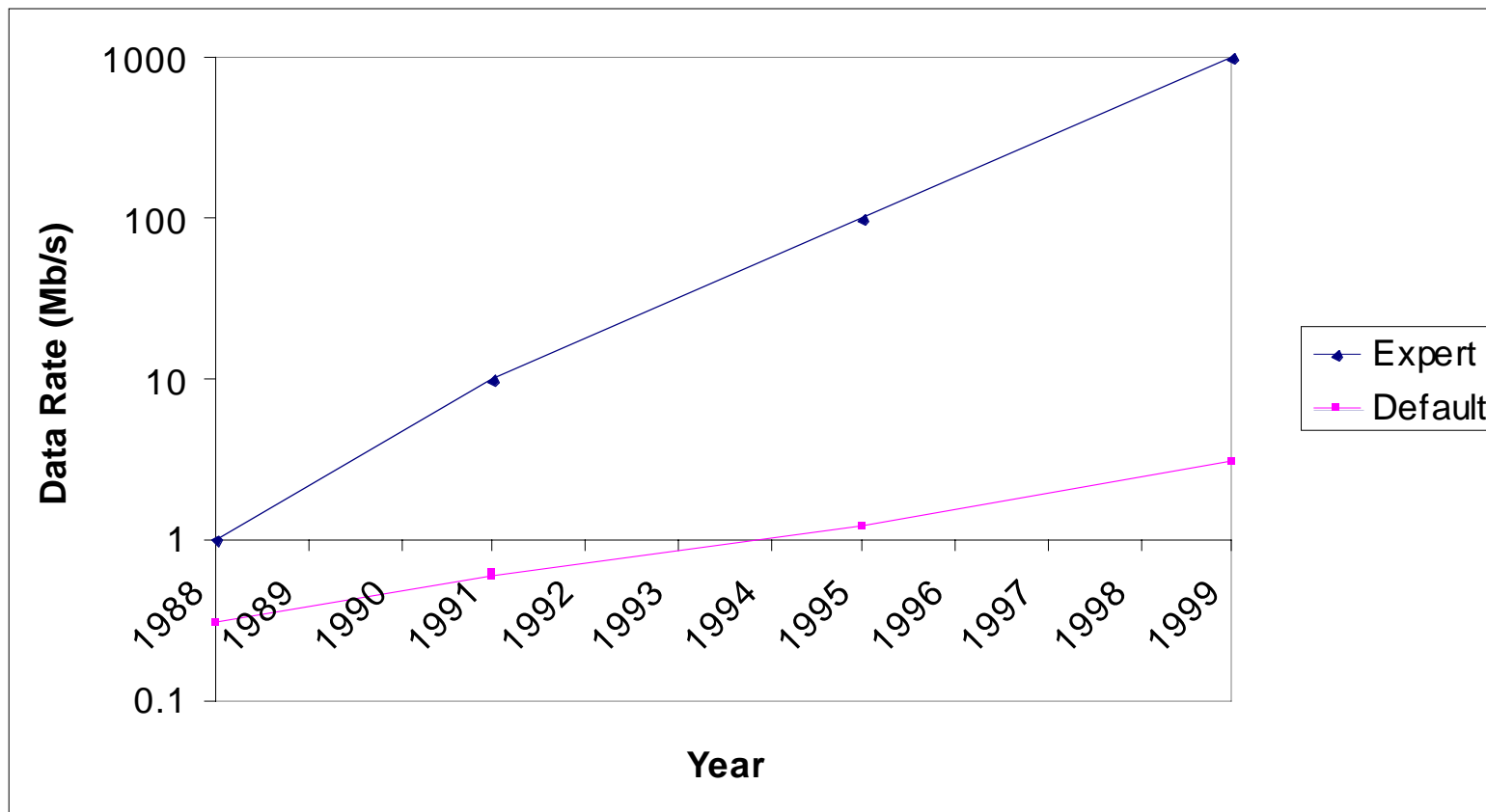
Plans for Performance Improvement (cont)

as reported in October with updates

- “Building patches for Linux (possibly getting them into Red Hat release) as a way to encourage other OS vendors to do the same thing”
 - major progress with creation of the Web100 project
- “Labeling sites and end-systems within each site which are capable of 100x performance; eventually making it typical”
 - still debating the merits of “labeling” as a part of a larger network infrastructure labeling

The Wizard Gap

(from Matt Mathis, NLANR/PSC)



Web100 Project

- Joint effort between PSC, NCAR, NCSA currently under NLANR
- Answer to most pressing end-to-end performance problems in host software
- Focus is solve TCP tuning issues and creating new socket like APIs for TCP knobs
- Targeting 100x Web over 100x Internet
- Components: Linux, Intel platform, Apache web server, either AOL Communicator/Mozilla or MS IE for browser
- Goal is a complete shrink-wrapped product not just bits of code
- <http://www.scd.ucar.edu/nets/projects/web100/>

What does SC99 Gbps demo mean for the 100x infrastructure?

- Is there really a Gbps application waiting for end systems and networks to deliver?
- We still don't have a robust reliable easy-to-use out-of-the-box plug-and-play end-to-end 100Mbps environment, need to fix this first
- Gbps “demos” are very useful for pushing the technology but that should not be confused with requirements for “day to day service”
- That's why we have the 100x and 1000x components within NGI